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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,824	09/08/2003	William R. Richards	WRR-103-US	9405

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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT PAPER NUMBER

1745

DATE MAILED: 03/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/656,824

Applicant(s)

RICHARDS, WILLIAM R.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for domestic priority under 35 U.S.C. 119(e).

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "15" has been used to designate both "fuel cell module" and "a basic multi-cell module" (See page 8, lines 10-14). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

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The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The disclosure is objected to because of the following informalities: on page 9, line 2, the specification recites "*to the fuel cell modules 15. n The*". It should be corrected. Appropriate correction is required.

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

6. Claim 1 is objected to because of the following informalities: the recitation "*said modules having electrical connection said end plates and said base when*" appears to be grammatically awkward. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. The language "*at least as many*" in claim 1 renders the claim indefinite because it is unclear how many receiving sections applicant is instantly intending to recite. The combination of "*at least*" and "*as many*" provides no indication for ascertaining the specific number thereof.

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10. The language "*with sufficient force*" in claim 4 and "*a significantly improved level*" in claims 7 and 8 is a relative term which renders the claim indefinite. The foregoing terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. In this case, it is uncertain what specific magnitude or degree applicant intends to recite by the terms "*sufficient*" or "*a significantly improved level*".

11. Claims 4 recites the limitations "said electrical plugs" and "said sockets" in line 2. There is insufficient antecedent basis for this limitation in the claim.

12. Claims 5 recites the limitation "said tapered sides" in line 2. There is insufficient antecedent basis for this limitation in the claim.

13. Claims 7 (line 7) and claim 8 (line 8) recite the limitation "the active area". There is insufficient antecedent basis for this limitation in the claim.

14. Claim 8 recites the limitation "an individual cell" in lines 5 and 8-9 (two occurrences). There is insufficient antecedent basis for this limitation in the claim. Claim 8 recites the same limitation twice.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

16. Claims 1, 3-4 and 6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Mukerjee et al 2002/0168560.

The present application is directed to a modular fuel cell wherein the disclosed inventive concept comprises the specific configuration of the modular fuel cells therein.

As to claim 1:

Mukerjee et al disclose modular fuel cells including fuel and air supply base manifold (TITLE). A base manifold for a modular fuel cell assembly comprising a plurality of receiving areas for receiving a plurality of fuel cell stacks (ABSTRACT/ P. 0010); a fuel inlet passageway disposed between a manifold fuel inlet port and a plurality of stack fuel inlet ports; an oxidant inlet passageway disposed between a manifold oxidant inlet port and a plurality of stack oxidant inlet ports (ABSTRACT/ P. 0010); a fuel outlet passageway disposed between a plurality of stack fuel outlet ports and a manifold fuel outlet port; and an oxidant outlet passageway disposed between a plurality of stack oxidant outlet ports and a manifold oxidant outlet port (ABSTRACT/ P. 0010). The assembly includes a port assembly for introducing cathode air and anode fuel to the assembly (P. 0021).

Disclosed is the presence of stack cap 13 and a stack footprint 15 sandwiching the electrochemical cells (P. 0021). *Thus, the stack cap and the stack foot print act as the end plates.* It is disclosed that an alternate embodiment has the footprints electrically disposed to the manifold 16. Each stack 12 is electrically conductive, and has a top terminal electrically connected to its cap 13; and a bottom terminal 28 electrically connected to its footprint 15. (P. 0021). *Thus, all fuel cell stack modules are electrically connected to their end plates as well as to the base of the receiving areas.*

Mukerjee et al further disclose that, generally, the system may comprise at least one fuel cell assembly in combination with respective control valves and a multiplicity of sensors and actuators (P. 0020). *Hence, it is noted that Mukerjee et al readily envision and provide specific guidance to positively employ control valves and actuators, singly or collectively, in the fuel cell system as ancillary equipment for supporting the operation thereof. Since the claimed valves and actuators do not indicate any further structural limitation or spatial orientation other than being “apparently” connected to the supply ports and accommodated in the fuel cell modules, it is contended that the teachings of Mukerjee et al directly envisage the use of such components (i.e. valves and actuators) as part of the flow distribution system.*

The specific fuel cell stack modules attached to the receiving areas can be observed from viewing **Figure 1**:

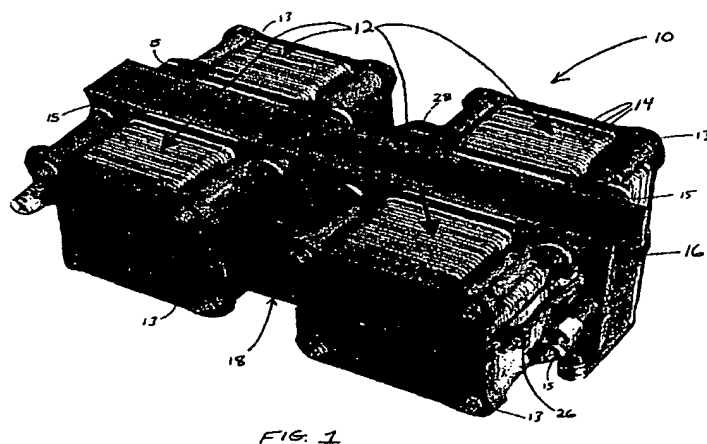


FIG. 1

Concerning claims 3-4:

Mukerjee et al disclose stack cap 13 and a stack footprint 15 sandwiching the electrochemical cells (P. 0021). *Thus, the stack cap and the stack foot print act as the end plates.* It is disclosed that an alternate embodiment has the footprints electrically disposed to the

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manifold 16. Each stack 12 is electrically conductive, and has a top terminal electrically connected to its cap 13; and a bottom terminal 28 electrically connected to its footprint 15. (P. 0021). *Thus, all fuel cell stack modules are electrically connected to their end plates as well as to the base of the receiving areas. In particular, it is noted that the top terminal connected to the cap and the bottom terminal connected to the footprint provides the necessary contact and engaging relationship to maintain the fuel cell stacks electrically connected thereto and in place.*

With reference to claim 6:

Mukerjee et al further disclose that, generally, the system may comprise at least one fuel cell assembly in combination with respective control valves and a multiplicity of sensors and actuators (P. 0020). *Hence, it is noted that Mukerjee et al readily envision and provide specific guidance to positively employ control valves and actuators, singly or collectively, in the fuel cell system as ancillary equipment for supporting the operation thereof. Since the claimed valves and actuators do not indicate any further structural limitation or spatial orientation other than being “apparently” connected to the supply ports and accommodated in the fuel cell modules, it is contended that the teachings of Mukerjee et al directly envisage the use of such components (i.e. valves and actuators) as part of the flow distribution system.*

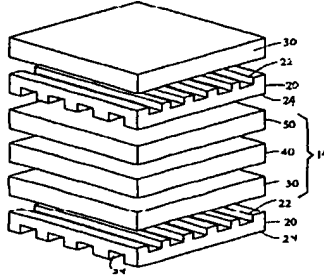
With regard to claims 7-8:

Figure 2 shows interconnects 20 disposed adjacent to the electrochemical cell and comprising passageways 22 to carry fuel to the anode from the inlet port at the port assembly; and passageways 24 carrying oxygen to the cathode which is thereby disposed in fluid communication to an air inlet port at the port assembly 18 (P. 0023/ Figure 2). *It is noted that*

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interconnect are also known in the art as providing the same function of a bipolar separating plate.

FIG. 2



As a result, the present claims are anticipated.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

19. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukerjee et al 2002/0168560 as applied to claim 1 above, and further in view of Bourgeois et al 2005/0064273.

Mukerjee et al is applied, argued and incorporated herein for the reasons above. However, the preceding reference fails to expressly disclose the specific module tapering configuration and the taper angle.

Bourgeois et al disclose fuel cell stack and fuel cell modules (TITLE) including fuel manifold including at least one of each of intake and exhaust fuel manifold; and a flow field that guides an oxidant flow (ABSTRACT).

Figure 4 below illustrates planar fuel cell having an hexagonal shape (P.0022) and fuel feed line 76 and fuel exhaust line 78 (P.0034); and inner volume 64 allowing passing of air introduced at oxidant inlet 68 (P.0028).

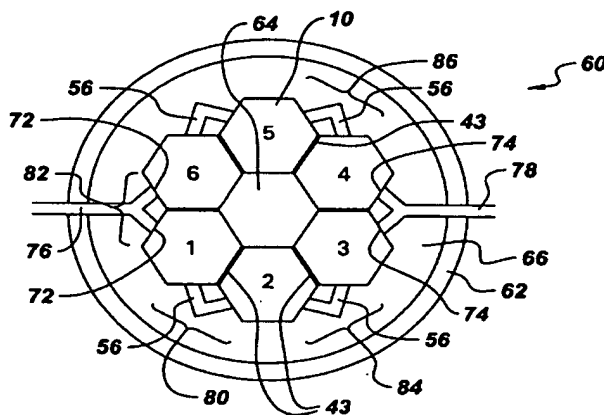


Fig. 4

Bourgeois et al disclose that each planar fuel cell unit is polygonal. Beneficially, polygonal configurations of fuel cell units are relatively easy to manufacture and permit minimal yet robust sealing arrangement and sufficient resistance to the reactant flow through the stack;

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and self-alignment of the fuel cell units due to the angles provided by the polygonal shape (P. 0022).

Examiner's note: *it is averred that such a polygonal shape of the fuel cell units produces substantially the same effect of specifically claimed module tapering configuration and taper angle. That is to say, the specific polygonal shape of the fuel cell units necessarily accommodates the cells so as to wedge them together by the polygonal tapering sides.*

In view of the above, it would have been obvious to a person possessing an ordinary level of skill in the pertinent art to use the specific module tapering configuration and the taper angle of Bourgeois et al in the modular fuel cell of Mukerjee et al because Bourgeois et al use the polygonal tapering shape of the polygonally shaped fuel cell units to achieve a robust sealing arrangement and sufficient resistance to the reactant flow through the stack as well as self-alignment of the fuel cell units due to the angles provided by the polygonal shape. Bourgeois et al disclose that such a polygonal tapering shape of the fuel cell units is relatively easy to manufacture.

As to the specific taper angle, it is noted changes in shape is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed taper angle is significant. In re Dailey, 149 USPQ 47. It is also noted that aesthetic design changes having no mechanical function cannot be relied upon to patentably distinguish the claimed invention from the prior art. In re Seid , 73 USPQ 431. (See **MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale**).

Furthermore, Bourgeois et al recognizes “*the taper angle*” as a variable which achieves a recognized result (i.e. self-alignment of the fuel cell units due to the angles provided by the

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polygonal shape), thus, the claimed range of the taper angle results from the characterization as routine experimentation of an optimum or workable range. Accordingly, the taper angle is deemed a result-effective variable. In re Aller 105 USPQ 233, 235; In re Hoeschele 160 USPQ 809, In re Antonie 195 USPQ 6 (**MPEP 2144.05 II. Optimization of Ranges**).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Primary Examiner
Art Unit 1745



**RAYMOND ALEJANDRO
PRIMARY EXAMINER**